

FAIRCHILD STEREO LIMITER - MODEL 670

OUTSTANDING FEATURES

FIRST MODERN LIMITER

A radical departure from the classical limiter design in the MODEL 670 is characterized by the complete absence of audible thumps, absence of distortion and noise, and it is extremely stable over long periods of time.

1/4 UNITS IN ONE

The MODEL 670 is either 2 Independent Limiters, or by the flick of a switch a Vertical-Lateral Component Limiter--all this enclosed within 1 1/4 inches of rack space.

INDEPENDENT CONTROL OF BOTH VERTICAL AND LATERAL AMPLITUDES ON STEREO DISKS

Large vertical amplitudes on STEREO DISKS often produce processing as well as tracking problems. Large vertical amplitudes are produced by random coincidence of out-of-phase components in the two STEREO channels. The MODEL 670 is the only unit presently in production which can control both components (vertical and lateral) independently, and accomplish this with minimum loss of separation.

EXTREMELY FAST ATTACK TIME

Many a short transient can pass through conventional limiters because of their slowness in attack. The MODEL 670 can produce full limiting effect during the first 10,000ths of a second.

VARIABLE RELEASE TIME

Different program materials require different limiting action. By choosing the correct release time characteristic, even severe limiting can be made to be practically imperceptible. The MODEL 670 supplies six different timing curves, several of them making the release time an automatic function of the amount of limiting used.

LIMITER OR COMPRESSOR

The type of program material as well as personal preference dictate the use of either a limiter or a compressor. The MODEL 670 can be adjusted to work either as a compressor, with a ratio of 2 to 1 and a threshold of 5 db below normal program level; or as a peak limiter, with a compression ratio of 30 to 1 and a threshold of 10 db above normal program level; or it can be adjusted to operate anywhere in-between these two extremes.

RELIABILITY

Highest grade commercial and military components are used throughout working well below their maximum ratings to insure long, trouble-free operation.

LIMITING FOR STEREO DISKS

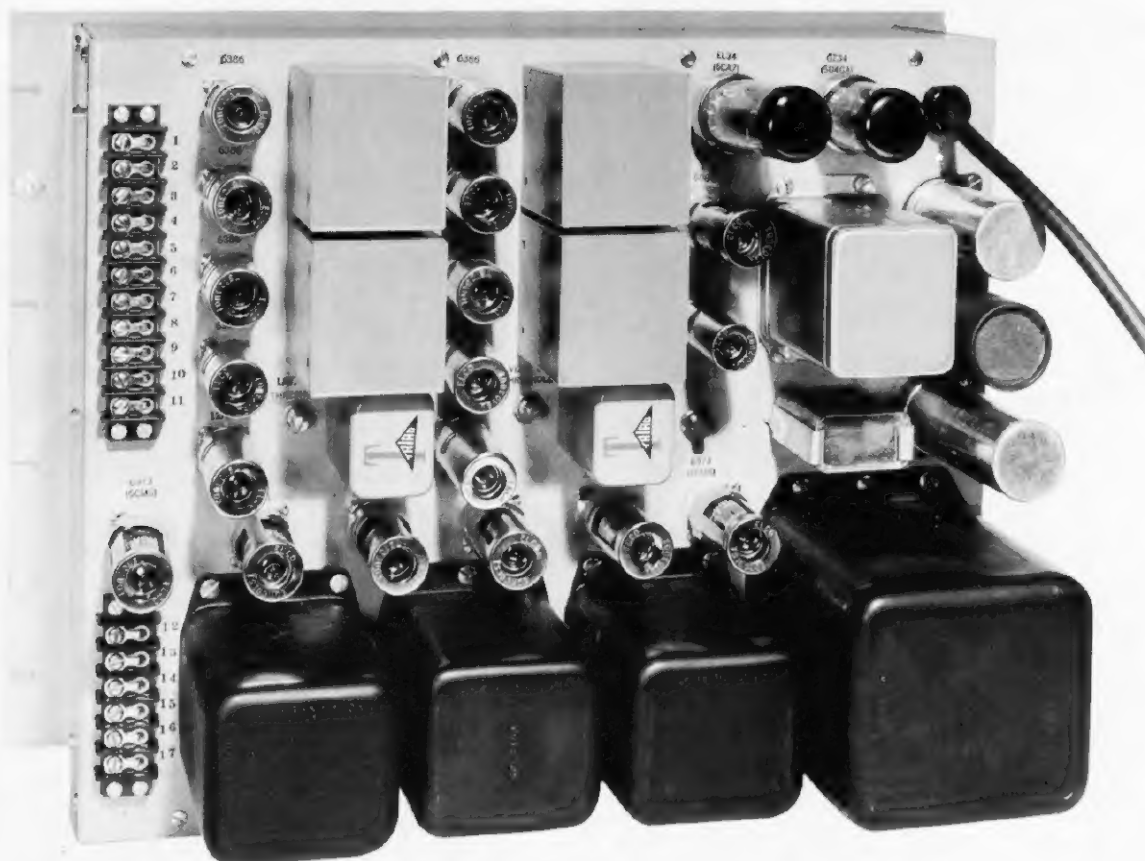
The cutting of STEREO DISKS has uncovered a number of new problems heretofore unknown. The normally modulated STEREO groove requires twice the space of lateral grooves for similar modulation, yet the available space is no greater. In addition, the two STEREO channels, depending on their phase relationship, result in either lateral or vertical modulation or a combination of both. It stands to reason that some peaks can result in purely vertical modulation on the disk, others purely lateral. If this were allowed to happen continually, the result would be only 15 minutes on the STEREO LP side, or else it would be necessary to reduce the recorded level radically. Otherwise, judicious use of variable pitch and variable depth would have to be exercised. The fact is, because of the smaller playback tip radii and the response of the playback pickups to vertical as well as lateral motions, our signal-to-noise ratio on STEREO DISKS is already reduced over the lateral counterpart. Besides, radical use of automatic variable depth will further increase processing problems already severe in STEREO DISKS.

Another problem exists because of the difficulty of tracking large vertical amplitudes. Most commercially available STEREO pickups have considerably less vertical compliance and consequently are less capable of tracking large vertical modulations. Also, we should not forget that the tip radius on the STEREO playback stylus is still 0.7 mil or 1.4 mils diameter, which necessitates the minimum of 1.4 mil groove width, or poor tracking might result.

The one apparent solution to these problems is to break the left and right STEREO channels down to their respective vertical and lateral components electrically. Limit the vertical and lateral components independently corresponding to the available groove space and depth, then recombine these components to regain the left and right channels. This has been done in the FAIRCHILD MODEL 670 LIMITER and many thousands of STEREO masters have been cut successfully with the help of this FAIRCHILD unit.

The limiting of the vertical and lateral components instead of the left and right channels has additional merits. Such limiting will retain the spatial distribution of instruments and soloists as originally recorded without producing any annoying image drift. Of course some program material of the ping-pong type requires independent limiting of each channel, and this is also available in the MODEL 670 LIMITER.

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FAIRCHILD MODEL 670 LIMITER-AMPLIFIER
TWO-CHANNEL FOR STEREO

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GENERAL DESCRIPTION

The FAIRCHILD MODEL 670 incorporates on one chassis either two independent limiters which act on the left and right channels or any other independent program sources, or which act on the vertical and lateral components of the two STEREO signals. This is accomplished by first bringing the two STEREO channels through a matrixing network and dividing them into their respective vertical and lateral components limiting the vertical and lateral components independently, then recombining the vertical and lateral components through a second matrixing network into the left and right channels again.

Each half of the MODEL 670 uses only a single push-pull stage of audio amplification and an extremely high control voltage with the result that the Automatic Gain Control Amplifier never produces any audible or observable thumps. Contrary to most limiting amplifiers heretofore available, this unit has extremely low distortion and noise under all conditions either as a straight-through amplifier or under maximum limiting conditions.

The attack time of the unit is made extremely fast in order to catch short transients, and the release time is made adjustable from .3 seconds to 25 seconds in six positions. Two of these positions make the release time an automatic function of the nature of program material by providing fast recovery for short-duration peaks and an automatic reduction of overall program level should the program level remain high.

In the circuitry used, each half of the amplifier consists of two separate amplifiers: one to control gain, the other to provide the necessary power for producing the DC control voltage. Because of this, the controls are somewhat different from most other limiters. Essentially there is one control common to both channels switching from two independent limiters to the vertical-lateral component limiting, and four controls for each half: a Switch for Metering; an Input Level Control; a Limiting Threshold Control; and an Attack and Release Time Switch.

Owing to the wide choice of attack and release time as well as the automatic recovery feature, this unit can be used to limit program material severely and still not produce the audible thumps or pumping so often associated with limited program material. A limiting meter is provided with provision for connecting a remote meter to the terminals exposed at the rear of the amplifier.

The MODEL 670 is designed to be placed into any normal line level circuit and could be set to have a unity gain at no limiting. Since all critical components are of highest quality working well below their maximum ratings, a dependable operation can be expected.

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SPECIFICATIONS

(each channel, unless otherwise specified)

INPUT IMPEDANCE	600 ohms.
OUTPUT IMPEDANCE	600 ohms.
RANGE OF INPUT LEVEL	0 dbm to +16 dbm.
OUTPUT LEVEL	+4 or +8 dbm (+22 dbm clipping point).
GAIN	7 db.
FREQUENCY RESPONSE	20 cycles to 15 K, ± 1 db.
SEPARATION	A-B position: 60 db. Vertical-Lateral position: 35 db.
NOISE LEVEL	70 db below +4 dbm.
LIMITING NOISES	Below audibility.
INTERMODULATION OR HARMONIC DISTORTION	Less than 1% at any level up to +18 dbm output (no limiting). Less than 1% at 10 db limiting +12 dbm output.
ATTACK TIME (adjustable)	.2 milliseconds on positions 1, 2, and 6. .4 milliseconds on positions 3, 4, and 5.
RELEASE TIME (from 10 db of limiting)	Position 1: .3 seconds. Position 2: .8 seconds. Position 3: 2 seconds. Position 4: 5 seconds. Position 5: Automatic function of program material: 2 seconds for individual peaks. 10 seconds for multiple peaks. Position 6: Automatic function of program material: .8 seconds for individual peaks. 10 seconds for multiple peaks. 25 seconds for consistently high program level.
COMPRESSION RATIO	A function of the amount of limiting as well as setting of the two threshold controls which can be set to operate at ratios from 1:2 to 1:30.
POWER REQUIREMENTS	115 volts, 50-60 cycles AC, 3 amps.

SPECIFICATIONS contd.

STABILITY

Unit maintains stability of gain, gain reduction and balance over the range of line voltage fluctuations from 100 to 127 volts.

CONTROLS

- a) 2 Input Gain Controls
Step attenuator: 1 db per step.
- b) 2 Threshold Controls
Continuously variable.
- c) 2 Time-Constant Switches
6 positions so as to provide fixed and variable time constants for any type of program material.
- d) 2 Metering Switches
3 positions so as to measure plate current of each control tube, or as a limiting indicator.
- e) Mode Switch
A-B position: 2 independent limiters.

Vertical-Lateral position: matrixing input and output, left and right in and out, limiting action vertical-lateral.

f) ON-OFF Switch

MECHANICAL DIMENSIONS

Standard 19" rack, 1 1/4" panel space, depth behind panel 11".

WEIGHT

Approximately 65 lbs.

TUBE COMPLEMENT

8-6386; 1-6084; 1-5651; 2-12AX7; 2-12BH7; 1-EL34;
4-6973; 1-GZ34 (5V4).

PRICE

\$1,435.00

TERMS

1%10 days, net 30, f.o.b. Long Island City, New York.
(Special terms may be arranged).

DELIVERY

4 to 8 weeks after receipt of firm order.

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FAIRCHILD RECORDING EQUIPMENT CORPORATION
10-40 45th Avenue
Long Island City 1, New York